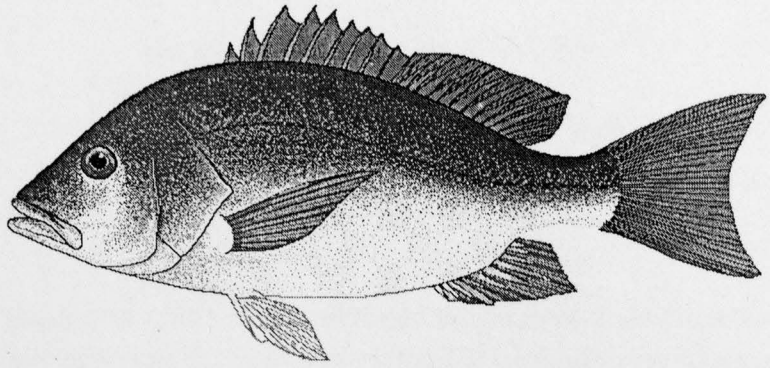
Red Snapper Discards in Texas Coastal Waters – A Fishery Dependent Onboard Pilot Survey of Recreational Headboat Discards and Landings



Robbie Cada/FishBase 99

Prepared for

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by

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Abstract

This fishery dependent pilot study determined the quantity and characteristics of red snapper recreational headboat discards and landings from three ports (Galveston, Port Aransas, and Port Isabel) along the Texas coast during the months of August and early September 1999. Mean fishing depth during 42 trips was 23.7 fathoms (range, 7.3 – 52.2, 11.3 s.d.). Reels sampled were 36.5% of reels in use. A total of 3,863 snapper were sampled during the study period. Snapper <18 inches made up 92.3% of snapper caught, those <15 inches made up 75.5% of the catch. When brought on board, 70.1% of snapper appeared normal and 26.1% had their stomach protruding. When discarded, 52.8% of snapper were released alive & swam down, 19.9% swam erratically, 13.2% floated, 1.3% were dead, and 12.9% were kept. Fish released either dead or floating were caught at greater depths than fish which swam down or erratically. Galveston had the largest discard:landing ratio (218:1), smallest mean weight per fish (1.5 pounds), and the smallest mean fish total length (13.2 inches). Port Aransas had the lowest discard: landing ratio (5.2:1) along with the largest mean weight per fish (2.1 pounds), and mean total length per fish (15.2 inches, 2.5 s.d.).

Purpose

A. *Description of problem*

Red snapper is the most economically important species in the Gulf of Mexico reef-fish fishery. In 1998, federally mandated Red Snapper Workshop panelists identified several top research priorities relating to Red Snapper Fishery Assessment Parameters. One of the most important ones was better documentation of discard mortality rates for the directed recreational fishing sector, especially from a depth-stratified perspective. Recreational discards resulting from the catch of non-legal fish as defined by size and bag

limits for the red snapper recreational headboat fishery add an unknown contribution to the recreational bycatch and bycatch mortality in Gulf of Mexico waters. This study provides better documentation of discard rate by depth in the directed recreational fishery along the Texas coast. Results will be available for use to improve the NMFS red snapper stock assessment and the Red Snapper Fishery Management Plan established by the Gulf of Mexico Fishery Management Council.

B. *Objectives of the project*

The primary objective of this fishery dependent pilot study was to determine the quantity and characteristics of red snapper recreational headboat discards and landings from three ports (Galveston, Port Aransas, and Port Isabel) along the Texas coast using NMFS trained observers during the months of August and early September 1999. The limited time frame of this study was driven by the closure of the red snapper fishery in federal waters at the end of August. The long-term goal is to utilize methods developed during this pilot study to develop a long-term monitoring program for recreational discards that can be used to improve red snapper stock assessment in the Gulf of Mexico.

Approach

A. *Detailed description of work performed*

This pilot study estimated biological and catch characteristics and catch per unit effort parameters for red snapper discards and landings from recreational headboats fishing in EEZ and state waters and was based in three ports (Galveston, Port Aransas, and Port Isabel) along the Texas coast. Sampling occurred during the months of August and early September 1999, prior to closure of the red snapper fishery in federal waters, and in state waters during September. Data were collected following protocols described in MRAG Americas (1999), FC.1 Reef fish fishery observer program, and Gitschlag and Renaud (1994). Methodology closely followed already existing NMFS methods to assure data compatibility. Either one or two NMFS-trained observers were placed aboard as many trips as possible on headboats from each of the three ports.

Catch specific information was collected for each trip and set on: date and time, latitude and longitude, fishing depth (fathoms), bottom type, wave height (feet), fishing gear type (manual or electric reels), number of fishers and reels, and hours fished.

Biological data included estimates of length (mm) and weight (kg) for both discards and landings, condition and appearance of snapper brought on board, how and where hooked on the body, release method, and discard fate. Catch per unit effort data included number of fishers, reels, and hours fished. CPUE was calculated as: ("#Fish Caught" / "Set Hours") / "#Reels Sampled."

Condition of snapper when brought onboard was categorized into one of the following:

- Live – normal appearance;
- Live – stomach protruding;
- Live – eyes protruding;
- Live – combination of stomach & eyes protruding;
- Dead on arrival; or
- Not determined.

Hooking locations were divided into:

- Maxilla;
- Gill;
- Esophagus, or
- Other.

Release methods were:

- Remove hook;
- Cut leader;
- Swim bladder punctured;
- Combination of hook removal & swim bladder puncture; or
- Combination of cut leader & swim bladder puncture.

Discard fate was recorded as:

A. Fish kept;
B. Discarded alive, swim down;
C. Discarded alive, erratic swimming;
D. Discarded alive, floating; or
E. Discarded, dead.

Because it was likely that there would be too many reels on an entire headboat to be sampled effectively by one or two observers, each boat was divided into sections. A trip-specific random table of numbers was used to determine which boat section to sample during a set.

Literature Cited

Gitschlag, G.R., and M.L. Renaud. 1994. Field experiments on survival rates of caged and released red snapper. *North American Journal of Fisheries Management.* 14:131-136.

MRAG Americas, I. 1999. NMFS Response to the 1997 Peer Review of Red Snapper (*Lutjanus campechanus*) Research and Management in the Gulf of Mexico. National Marine Fisheries Service, St. Petersburg, FL. 146.

B. Project management

Dr. G. Joan Holt was responsible for supervision of Dr. B. A. Dorf and for monitoring project performance. Dr. Dorf was responsible for coordinating all project-related activities with participating headboat captains or owners, as well as all data management, and assisted in training fishery observers. Mr. Russell O'Brien (Fishery Observer Coordinator for the Gulf & South Atlantic Fisheries Foundation, Inc.) was responsible for hiring, training and coordinating fishery observers in the field. Selected headboat captains, crews and recreational fishers in Galveston, Port Aransas and Port Isabel were essential and voluntary participants in the study by providing willing access to fish brought on board.

Findings

This project provides data on biological and catch characteristics and catch per unit effort parameters for red snapper discards and landings from recreational headboats fishing in EEZ waters and based in three ports (Galveston, Port Aransas, and Port Isabel) along the Texas coast. The Texas coast and the greater depths where fishing occurs there are currently underrepresented in data collection efforts. This study will provide better documentation of discard rate by depth in the directed recreational fishery.

A. *Actual accomplishments & findings*

Allocation of Sampling Effort

Forty-two trips were made aboard 4 commercial headboats from 3 Texas fishing ports (Galveston, Port Aransas, and Port Isabel) during the month of August 1999. Six trips were made aboard 1 commercial headboat (Port Isabel) during the month of September 1999 (Table 1). Data were collected during 32 days and 1 night of observations. One hundred ninety-nine sets (170 in August & 29 in September) were sampled at the locations shown in Fig. 1.

Vessel, and Gear Characteristics

The average overall vessel length was 72 feet, ranging from 56 to 80 feet. All vessels had either fiberglass or aluminum hulls. Engine power ranged from 700 to 2,120 horsepower, with a mean of 1,232 horsepower. Crew size (not including the captain) ranged from 1 to 6 individuals, with a mean crew size of 3. Reels were either manual or

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electric (although only the headboat from Port Aransas carried electric reels), with 73% of all reels being manual.

Fishing Characteristics and Environmental Conditions

Mean depth for the 199 sets was 23.7 fathoms (11.3 s.d.), ranging from 7.3 to 52.2 fathoms (Fig. 2). Mean fishing depth was significantly different between ports in August ($F = 220.132$, $n = 169$, $df = 2$, $p < 0.0001$) with the greatest mean depth from Port Aransas (36.1 fm, 8.1 s.d.). Fishing depth was shallowest in Galveston (mean 13.6 fm, 3.4 fm s.d.), with intermediate August values from Port Isabel (mean 26.6 fm, 6.5 s.d.). In September, the only samples collected were in state waters from Port Isabel (mean 11.7 fm, 1.7 s.d.) (Fig. 2).

The mean number of reels sampled per set was 9.8 (2.5 s.d.), with a range of 1 to 22 reels. This mean constituted 36.5% of all reels in use (29.7% s.d).

Fishing time per set varied from 0.2 to 4 hours with a mean of 0.9 hours (0.6 s.d). The majority of fishing occurred during daylight hours, although there was 1 night fishing trip from Galveston.

The majority of sets (62.3%) occurred in 0 to 2 foot seas, with 37.7% in 3 to 5 foot seas. The most sets took place over rock bottom (55.6%), with mud (14.8%), and coral (1.0%) comprising the remainder. Fishing often occurred near hydrocarbon production platforms and over submerged structures such as wrecks or rocks.

Red Snapper Size Composition

A total of 3,863 red snapper were caught on hook-and-line during the study period. Of these, a total of 3,829 were measured and ranged from 4 to 36 inches in total length (Table 2). Mean total length was significantly different between ports in August ($F = 142.377$, $n = 2,927$, $df = 2$, $p < 0.0007$). The 13 - 14-inch size category contained the largest proportion (17.9%) of individuals overall, although Port Aransas had the their largest proportion of snapper (25.3%) in the 15 – 16-inch size category (Fig. 3, Table 2).

Red snapper less than 18 inches in total length made up 92.3% of snapper caught. Those less than 16 inches made up 75.5% of snapper caught. Snapper less than 15 inches constituted 59.2% of fish collected (Table 2). Percentage of 18+ to 15+ inch snapper by port is summarized in Table 3. Although Port Isabel had the greatest proportion of 18+ inches snapper in August samples, Port Aransas had the largest proportion of 17+ to 15+

inches snapper overall. There was no significant statistical relationship between depth and total length of snapper caught in this pilot survey for any port or all ports combined ($r^2 = 0.087$).

Red Snapper Hooking Location

Where on the body red snapper were hooked was determined for 3,849 fish. Of these, 91.8% were hooked in the maxilla, 6.2% were hooked in the esophagus, 0.8% were hooked in the gill, and 1.3% were hooked in some other area of the body.

Red Snapper Condition When Brought On Board

Condition of red snapper when brought on board was determined for 3,844 fish. Of these, 70.1% were normal in appearance, 26.1% had their stomach protruding from their mouths, 2.8% had protruding eyes, 0.6% had both eyes and stomach protruding, and 0.3% were brought on board dead. Table 4 shows the mean depth and frequency for red snapper condition when brought on board. The histograms in Figure 4 show condition frequency by depth. Although there were significant differences in mean depth between conditions ($F = 109.056$, $n = 3,840$, $df = 4$, $p < 0.0001$), there is no clear trend evident (Table 4).

Red Snapper Release

When snapper were discarded, 62.8% were released by removing the hook without puncturing the swim bladder. The swim bladder was punctured along with hook removal for 36.2% of released snapper.

Red Snapper Discard Fate

Discard fate was determined for 3,851 fish (Fig. 5): 12.9% were kept, 52.8% were released alive and swam down, 19.9% were released alive and swimming erratically, 13.2% were released alive and floating, and 1.3% were discarded dead. Figure 5 shows the breakdown of fate for each port.

Table 5 shows mean depth and frequency for red snapper discard fate. The histograms in Figure 6 show discard fate frequency by depth. There were significant differences in mean depth between fates ($F = 57.713$, $n = 3,848$, $df = 4$, $p < 0.0001$). Fish released either dead or floating were caught at greater depths than fish which swam down or swam erratically on release (Table 5).

Table 6 shows mean total length and frequency for red snapper discard fate. Figure 7 shows the breakdown of fate by total length for each port. Although there were significant differences in mean total length between fates ($F = 512.300$, $n = 3,818$, $df = 4$, $p < 0.0001$), the only clear trend is that all fates have similar total length distributions except for fish which were kept (Table 6).

Snapper kept from Port Aransas in August which were smaller than 18-inches were being harvested under a collecting permit for an ongoing research project at another institution. Smaller fish kept from Port Isabel in September were a reflection of the smaller minimum size requirement for snapper caught in Texas waters during September (15 inches) rather than the 18-inch minimum size for fish caught in August. As a result, that port had a larger proportion of kept fish than other locations.

It may be likely that snapper which were floating or exhibiting erratic swimming may have died or been subject to predation soon after release. However, it is beyond the scope of this pilot study to draw such a conclusion as no specific data were available on the longer term fate of these released snapper.

Red Snapper Discards & Landings

Discards and landings are summarized by numbers of fish (Table 7), whole weight of fish (Table 8), and total length of fish (Table 9). Galveston had the largest discard:landing ratio (218:1), the smallest mean weight per fish sampled (1.5 pounds), and the smallest mean fish total length (13.2 inches, 1.9 s.d.). Port Aransas had the lowest discard:landing ratio (5.2:1) along with the largest weight per fish 2.1 pounds, and total length per fish (15.2 inches, 2.5 s.d.).

CPUE (Catch per Unit Effort)

Mean CPUE for red snapper was 2.8 fish per angler hour (2.19 s.d.). There were no significant differences in CPUE between ports ($p > 0.0258$).

List of Tables & Figures

Tables

Figures

Table 1. Number of trips & sets sampled from Texas recreational headboats in August (A) and September (B) 1999 by fishing port.

F. AUGUST

	GALVESTON	PORT ARANSAS	PORT ISABEL	TOTAL
TRIPS	20	13	15	48
SETS	74	50	46	170

G. SEPTEMBER

	GALVESTON	PORT ARANSAS	PORT ISABEL	TOTAL
TRIPS	0	0	6	6
SETS	0	0	29	29

Table 2. Frequency distribution (A. Total %; B. Cumulative %) for total length (inches) of red snapper measured during Texas recreational headboat sets in August and September 1999.

A. Total %.

From (≥)	To (<)	Cumulative		Galveston, August		Port Aransas, August		Port Isabel, August		Port Isabel, September	
		Count	%	Count	%	Count	%	Count	%	Count	%
3.0	4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0	5.0	1	0.03	0	0.00	0	0.00	1	0.12	0	0.00
5.0	6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0	7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0	8.0	1	0.03	1	0.08	0	0.00	0	0.00	0	0.00
8.0	9.0	8	0.21	3	0.24	1	0.13	2	0.23	2	0.22
9.0	10.0	58	1.52	30	2.36	1	0.13	5	0.58	22	2.44
10.0	11.0	153	4.00	50	3.93	2	0.26	38	4.37	63	6.99
11.0	12.0	252	6.58	93	7.30	13	1.66	55	6.32	91	10.10
12.0	13.0	433	11.31	176	13.82	45	5.74	84	9.66	128	14.21
13.0	14.0	684	17.86	279	21.90	80	10.20	128	14.71	197	21.87
14.0	15.0	675	17.63	248	19.47	150	19.13	144	16.55	133	14.76
15.0	16.0	624	16.30	225	17.67	198	25.26	126	14.48	75	8.32
16.0	17.0	387	10.11	104	8.16	131	16.71	71	8.16	81	8.99
17.0	18.0	260	6.79	49	3.85	73	9.31	66	7.59	72	7.99
18.0	19.0	114	2.98	12	0.94	38	4.85	41	4.71	23	2.55
19.0	20.0	76	1.99	3	0.24	21	2.68	44	5.06	8	0.89
20.0	21.0	30	0.78	0	0.00	10	1.28	16	1.84	4	0.44
21.0	22.0	15	0.39	1	0.08	2	0.26	11	1.26	1	0.11
22.0	23.0	12	0.31	0	0.00	2	0.26	10	1.15	0	0.00
23.0	24.0	19	0.50	0	0.00	6	0.77	13	1.49	0	0.00
24.0	25.0	6	0.16	0	0.00	1	0.13	5	0.58	0	0.00
25.0	26.0	5	0.13	0	0.00	2	0.26	2	0.23	1	0.11
26.0	27.0	5	0.13	0	0.00	4	0.51	1	0.12	0	0.00
27.0	28.0	4	0.10	0	0.00	1	0.13	3	0.35	0	0.00
28.0	29.0	3	0.08	0	0.00	0	0.00	3	0.35	0	0.00
29.0	30.0	1	0.03	0	0.00	1	0.13	0	0.00	0	0.00
30.0	31.0	1	0.03	0	0.00	0	0.00	1	0.12	0	0.00
31.0	32.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
32.0	33.0	1	0.03	0	0.00	1	0.13	0	0.00	0	0.00
33.0	34.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
34.0	35.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
35.0	36.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
36.0	37.0	1	0.03	0	0.00	1	0.13	0	0.00	0	0.00
37.0	38.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Total	3829	100.00	1274	100.00	784	100.00	870	100.00	901	100.00

Table 2. Frequency distribution (A. Total %; B. Cumulative %) for total length (inches) of red snapper measured during Texas recreational headboat sets in August and September 1999.

B. Cumulative %.

From (≥)	To (<)	Cumulative		Galveston, August		Port Aransas, August		Port Isabel, August		Port Isabel, September	
		Count	%	Count	%	Count	%	Count	%	Count	%
3.0	4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0	5.0	1	0.03	0	0.00	0	0.00	1	0.12	0	0.00
5.0	6.0	1	0.03	0	0.00	0	0.00	1	0.12	0	0.00
6.0	7.0	1	0.03	0	0.00	0	0.00	1	0.12	0	0.00
7.0	8.0	2	0.05	1	0.08	0	0.00	1	0.12	0	0.00
8.0	9.0	10	0.26	4	0.31	1	0.13	3	0.35	2	0.22
9.0	10.0	68	1.78	34	2.67	2	0.26	8	0.92	24	2.66
10.0	11.0	221	5.77	84	6.60	4	0.51	46	5.29	87	9.66
11.0	12.0	473	12.35	177	13.90	17	2.17	101	11.61	178	19.76
12.0	13.0	906	23.66	353	27.71	62	7.91	185	21.26	306	33.96
13.0	14.0	1590	41.53	632	49.61	142	18.11	313	35.98	503	55.83
14.0	15.0	2265	59.15	880	69.07	292	37.25	457	52.53	636	70.59
15.0	16.0	2889	75.45	1105	86.74	490	62.50	583	67.01	771	78.91
16.0	17.0	3276	85.56	1209	94.90	621	79.21	654	75.17	792	87.90
17.0	18.0	3536	92.35	1258	98.74	694	88.52	720	82.76	864	95.89
18.0	19.0	3650	95.33	1270	99.69	732	93.37	761	87.47	887	98.45
19.0	20.0	3726	97.31	1273	99.92	753	96.05	805	92.53	895	99.33
20.0	21.0	3756	98.09	1273	99.92	763	97.32	821	94.37	899	99.78
21.0	22.0	3771	98.49	1274	100.00	765	97.58	832	95.63	900	99.89
22.0	23.0	3783	98.80	1274	100.00	767	97.83	842	96.78	900	99.89
23.0	24.0	3802	99.30	1274	100.00	773	98.60	855	98.28	900	99.89
24.0	25.0	3808	99.45	1274	100.00	774	98.72	860	98.85	900	99.89
25.0	26.0	3813	99.58	1274	100.00	776	98.98	862	99.08	901	100.00
26.0	27.0	3818	99.71	1274	100.00	780	99.49	863	99.20	901	100.00
27.0	28.0	3822	99.82	1274	100.00	781	99.62	866	99.54	901	100.00
28.0	29.0	3825	99.90	1274	100.00	781	99.62	869	99.89	901	100.00
29.0	30.0	3826	99.92	1274	100.00	782	99.75	869	99.89	901	100.00
30.0	31.0	3827	99.95	1274	100.00	782	99.75	870	100.00	901	100.00
31.0	32.0	3827	99.95	1274	100.00	782	99.75	870	100.00	901	100.00
32.0	33.0	3828	99.97	1274	100.00	783	99.87	870	100.00	901	100.00
33.0	34.0	3828	99.97	1274	100.00	783	99.87	870	100.00	901	100.00
34.0	35.0	3828	99.97	1274	100.00	783	99.87	870	100.00	901	100.00
35.0	36.0	3828	99.97	1274	100.00	783	99.87	870	100.00	901	100.00
36.0	37.0	3829	100.00	1274	100.00	784	100.00	870	100.00	901	100.00
37.0	38.0	3829	100.00	1274	100.00	784	100.00	870	100.00	901	100.00
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Table 3. Percentage of red snapper measured greater than or equal to 18, 17, 16 and 15 inches total length caught during Texas recreational headboat sets in August and September 1999.

Total Length (in)	Galveston %	Port Aransas %	Port Isabel (Aug) %	Port Isabel (Sep) %
18+	1.3	11.5	17.3	4.1
17+	5.1	20.8	24.9	12.1
16+	13.3	37.5	33.0	21.1
15+	30.9	62.8	47.5	29.4

Table 4. Mean depth (fathoms) and frequency for condition (when brought on board) of red snapper measured during Texas recreational headboat sets in August and September 1999.

	Mean Depth (fathoms) [% of catch]				
Condition	Summary (n=3,844)	Galveston (n=1,300)	Port Aransas (n=781)	Port Isabel, Aug (n=864)	Port Isabel, Sep (n=896)
Normal	18.5 [70.2%]	12.3 [71.1%]	35.0 [64.0%]	25.7 [46.4%]	12.3 [97.1%]
Stomach Protruding	23.6 [26.1%]	14.7 [28.5%]	32.7 [25.2%]	27.6 [47.5%]	15.9 [2.8%]
Eyes Protruding	33.8 [2.8%]	-	35.9 [9.4%]	29.9 [3.9%]	14.0 [0.11%]
Eyes & Stomach	31.9 [0.62%]	19.0 [0.08%]	39.0 [0.64%]	30.6 [2.1%]	-
Dead	31.4 [0.29%]	15.0 [0.31%]	41.3 [0.77%]	37.0 [0.001%]	-

Table 5. Mean depth (fathoms) and frequency for discard fate of red snapper measured during Texas recreational headboat sets in August and September 1999.

	Mean Depth (fathoms) [% of catch]				
Discard Fate	Summary (n=3,848)	Galveston (n=1,304)	Port Aransas (n=781)	Port Isabel, Aug (n=865)	Port Isabel, Sep (n=898)
Swim Down	18.8 [52.8%]	12.8 [57.6%]	32.3 [61.1%]	25.8 [28.7%]	12.2 [61.8%]
Erratic Swimming	19.0 [19.9%]	13.2 [29.8%]	33.3 [4.4%]	27.0 [31.9%]	12.7 [7.2%]
Floating	25.3 [13.3%]	13.3 [10.6%]	39.6 [17.0%]	27.3 [22.0%]	12.8 [5.5%]
Dead	26.2 [1.3%]	14.3 [1.5%]	39.9 [1.4%]	31.4 [2.0%]	-
Kept	23.1 [12.9%]	14.5 [0.5%]	38.0 [16.1%]	27.3 [15.5%]	12.6 [25.5%]

Table 6. Mean total length (inches) and frequency for discard fate of red snapper measured during Texas recreational headboat sets in August and September 1999.

	Mean Total Length (inches) [% of catch]				
Discard Fate	Summary (n=3,819)	Galveston (n=1,274)	Port Aransas (n=785)	Port Isabel, Aug (n=865)	Port Isabel, Sep (n=898)
Swim Down	13.5 [52.8%]	13.5 [57.6%]	14.8 [61.1%]	13.9 [28.6%]	12.5 [61.8%]
Erratic Swimming	13.6 [29.9%]	13.6 [29.9%]	14.5 [4.5%]	13.8 [31.9%]	12.1 [7.2%]
Floating	13.7 [13.2%]	13.3 [10.4%]	14.4 [16.9%]	13.9 [22.0%]	12.4 [5.5%]
Dead	13.5 [1.2%]	13.1 [1.5%]	13.9 [1.4%]	13.6 [2.0%]	-
Kept	18.1 [12.9%]	19.0 [0.5%]	18.5 [16.1%]	20.4 [15.4%]	16.6 [25.5%]

Table 7. Discards & landings (numbers) of red snapper measured from Texas recreational headboat sets in August (A) and September (B) 1999 by fishing port.

- AUGUST

	GALVESTON	PORT ARANSAS	PORT ISABEL	TOTAL
DISCARDS	1,300	658	738	2,696
LANDINGS	6	126	134	266
TOTAL	1,306	784	872	2,962
D:L	217.7 : 1	5.2 : 1	5.5 : 1	10.1 : 1

- SEPTEMBER

	GALVESTON	PORT ARANSAS	PORT ISABEL	TOTAL
DISCARDS	0	0	672	672
LANDINGS	0	0	229	229
TOTAL	0	0	901	901
D:L	-	-	2.9 : 1	2.9 : 1

Table 8. Discards & landings (whole weight, pounds) of red snapper measured from Texas recreational headboat sets in August (A) and September (B) 1999 by fishing port. Number in parentheses is the mean weight per fish sampled.

- AUGUST

	GALVESTON	PORT ARANSAS	PORT ISABEL	TOTAL
DISCARDS	1,934 (1.5)	1,155 (1.8)	1,124 (1.5)	4,213 (1.6)
LANDINGS	22 (3.7)	455 (3.6)	605 (4.6)	1,082 (4.1)
TOTAL	1,956 (1.5)	1,610 (2.1)	1,730 (2.0)	5,296 (1.8)

- SEPTEMBER

	GALVESTON	PORT ARANSAS	PORT ISABEL	TOTAL
DISCARDS	-	-	756 (1.1)	756 (1.1)
LANDINGS	-	-	559 (2.4)	559 (2.4)
TOTAL	-	-	1,315 (1.5)	1,315 (1.5)

Table 9. Discards & landings (mean total length, inches) of red snapper measured from Texas recreational headboat sets in August (A) and September (B) 1999 by fishing port. Number in parentheses is the standard deviation of total length.

- AUGUST

	GALVESTON	PORT ARANSAS	PORT ISABEL	TOTAL
DISCARDS	13.1 (1.8)	14.6 (1.6)	13.8 (2.1)	13.8 (1.9)
LANDINGS	18.8 (0.9)	18.4 (3.6)	20.4 (2.6)	19.4 (3.3)
TOTAL	13.2 (1.9)	15.2 (2.5)	14.8(3.2)	14.4 (2.6)

- SEPTEMBER

	GALVESTON	PORT ARANSAS	PORT ISABEL	TOTAL
DISCARDS	-	-	12.4 (1.5)	12.4 (1.5)
LANDINGS	-	-	16.5 (1.2)	16.5 (1.2)
TOTAL	-	-	13.4 (2.3)	13.4 (2.3)

Figure 1. Location of Texas recreational headboat sets in August and September 1999.

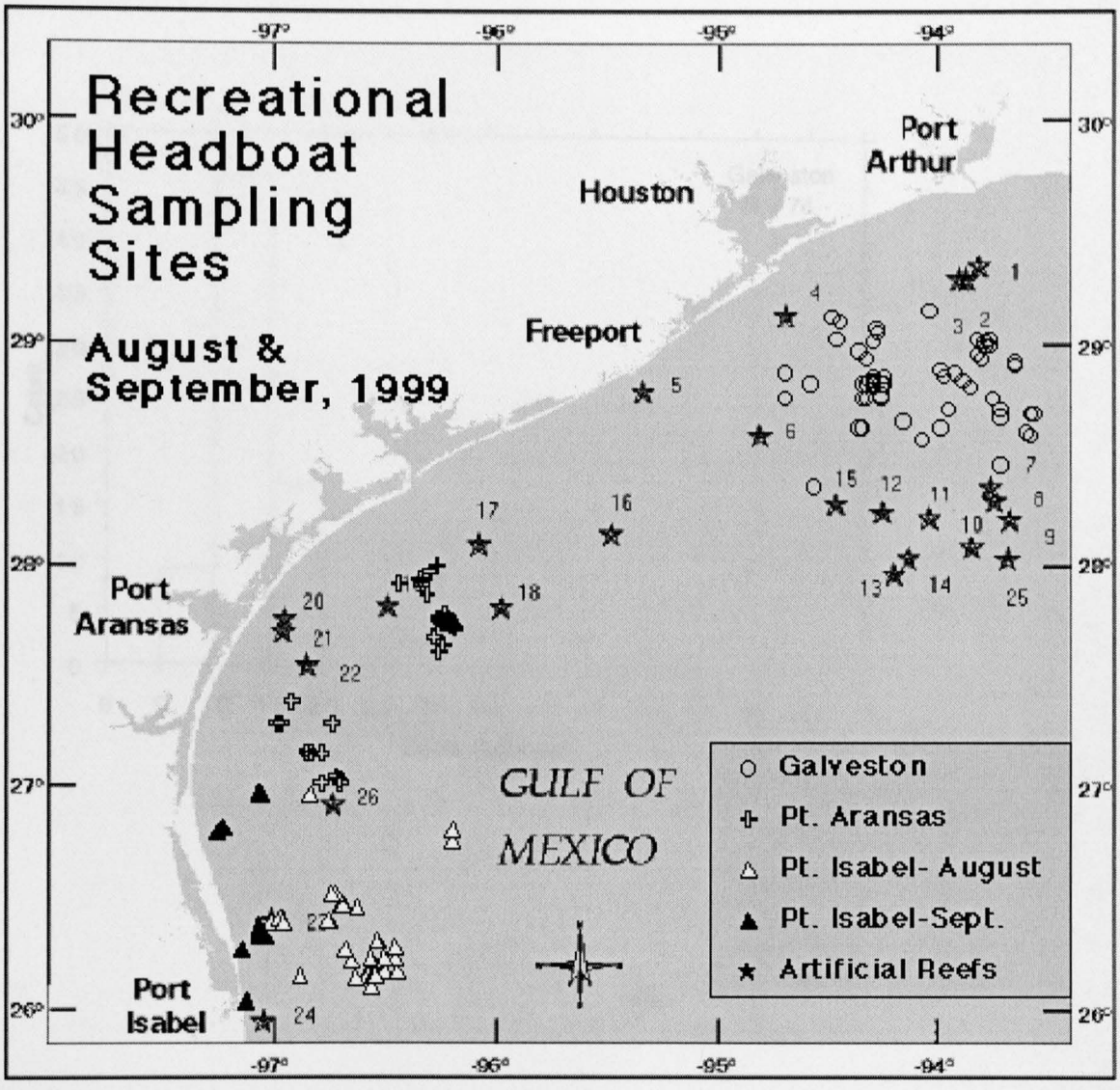


Figure 2. Fishing depth by port for recreational headboat sets in August and September 1999. A. Galveston; B. Port Aransas; C. Port Isabel (August); D. Port Isabel (September).

A. Galveston.

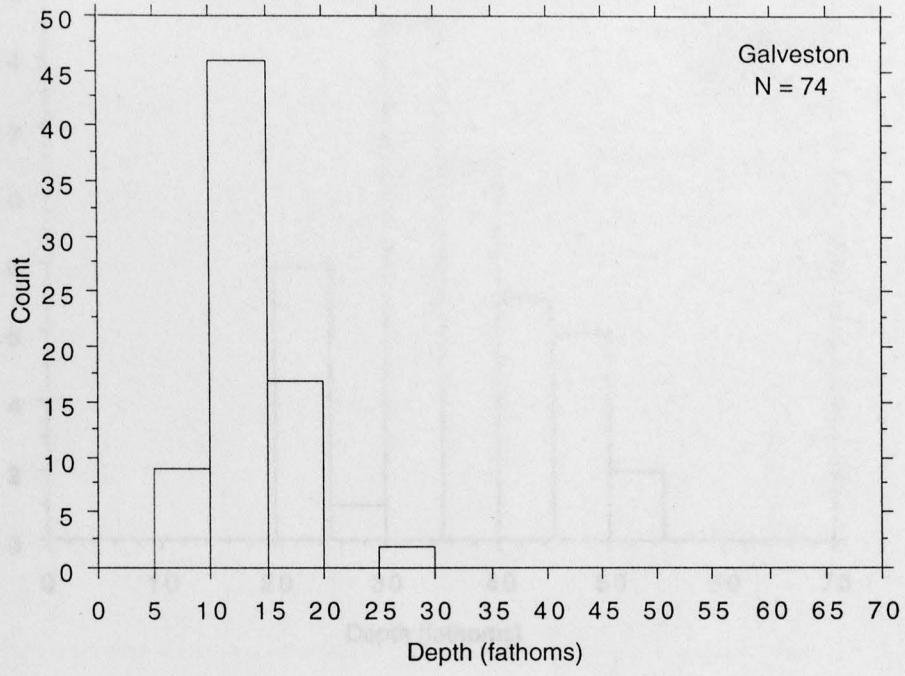


Figure 2. Fishing depth by port for recreational headboat sets in August and September 1999. A. Galveston; B. Port Aransas; C. Port Isabel (August); D. Port Isabel (September).

B. Port Aransas.

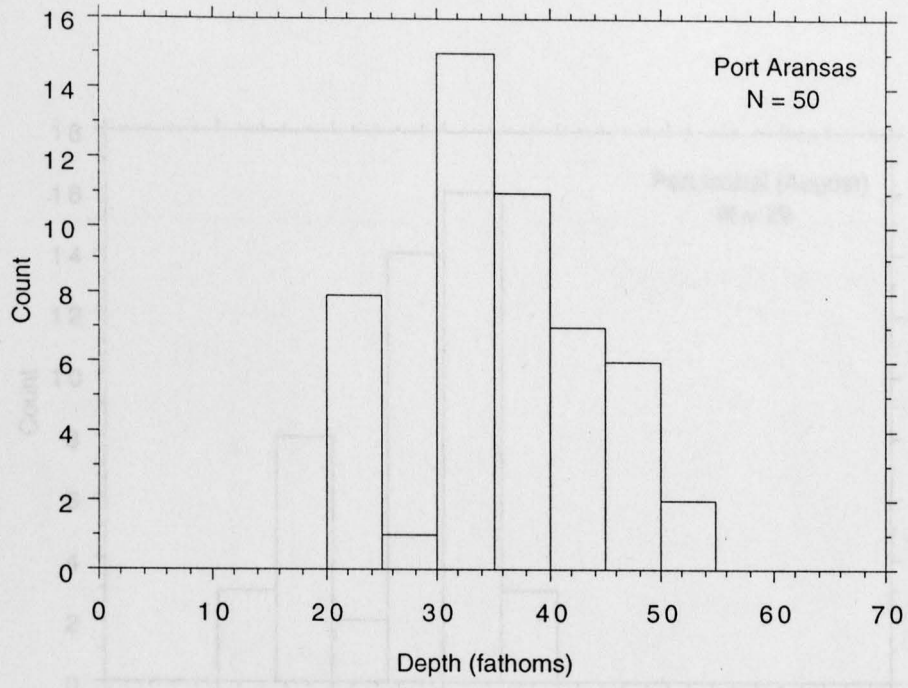


Figure 2. Fishing depth by port for recreational headboat sets in August and September 1999. A. Galveston; B. Port Aransas; C. Port Isabel (August); D. Port Isabel (September).

C. Port Isabel (August).

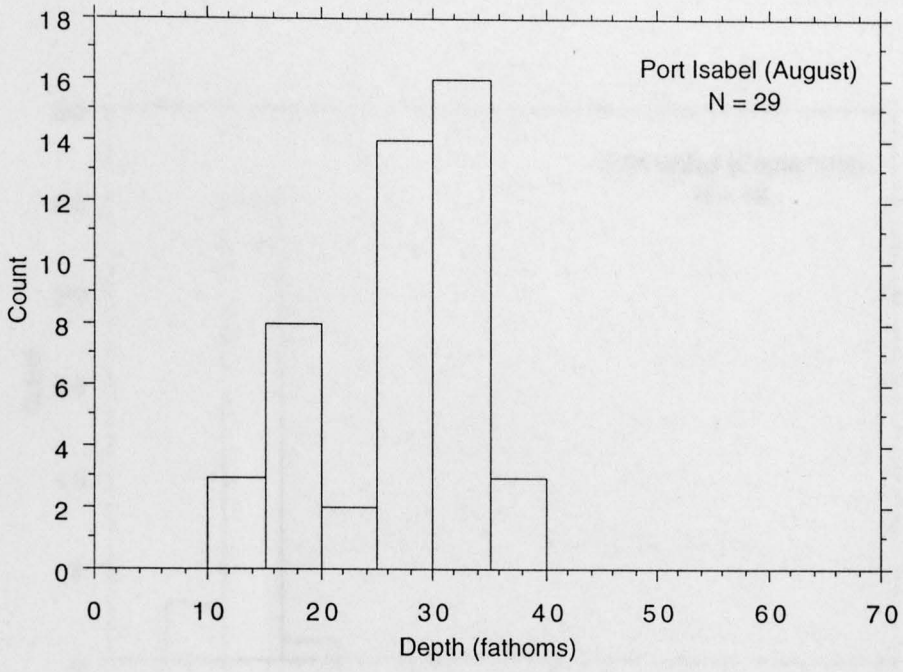


Figure 2. Fishing depth by port for recreational headboat sets in August and September 1999. A. Galveston; B. Port Aransas; C. Port Isabel (August); D. Port Isabel (September).

D. Port Isabel (September).

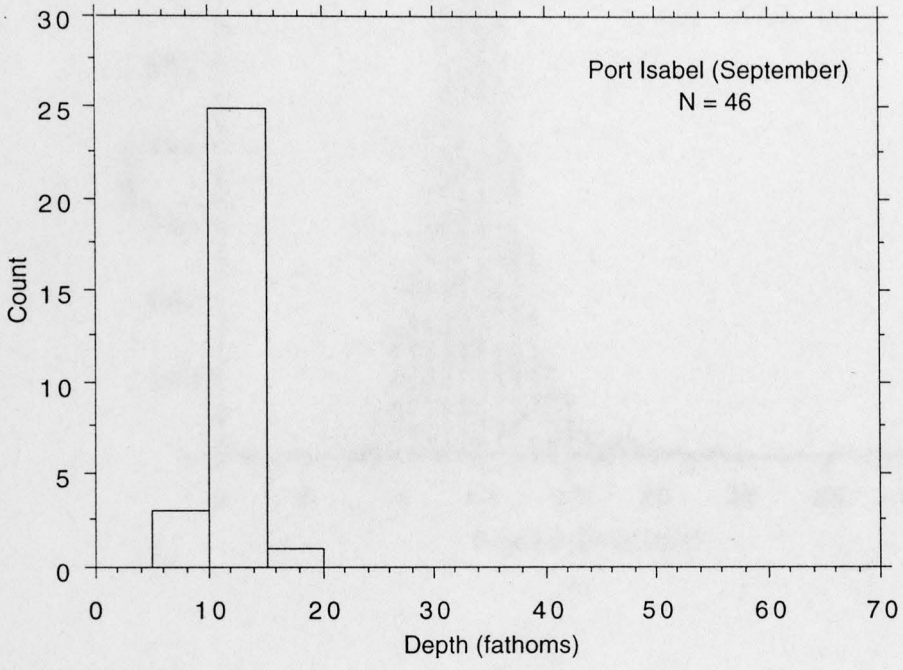


Figure 3. Size distribution of red snapper caught and measured during Texas recreational headboat sets in August and September 1999. A. Summary; B. Galveston (August only); C. Port Aransas (August only); D. Port Isabel (August); E. Port Isabel (September).

A. Summary.

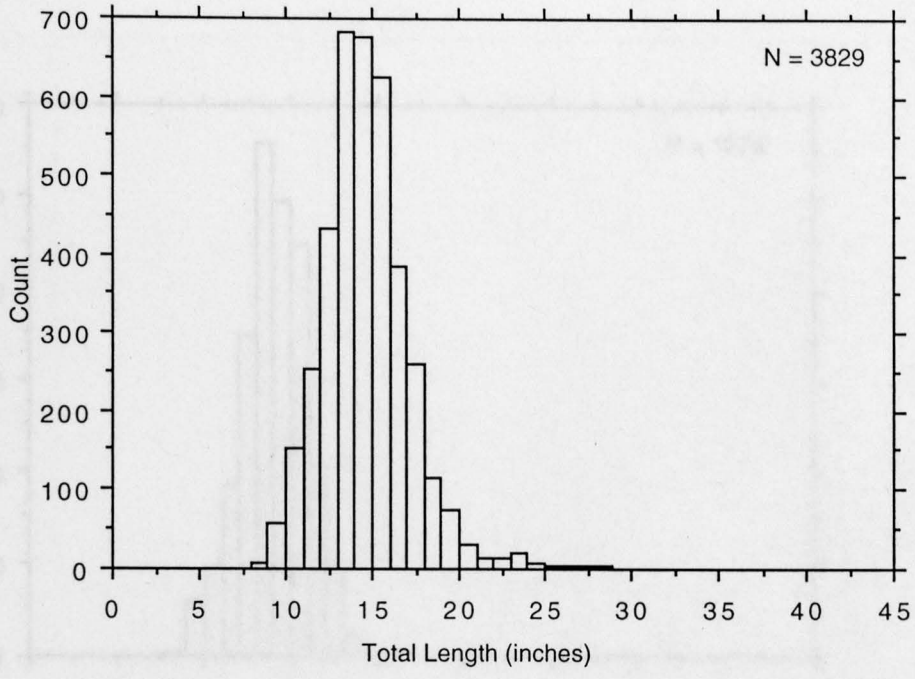


Figure 3. Size distribution of red snapper caught and measured during Texas recreational headboat sets in August and September 1999.

B. Galveston (August only).

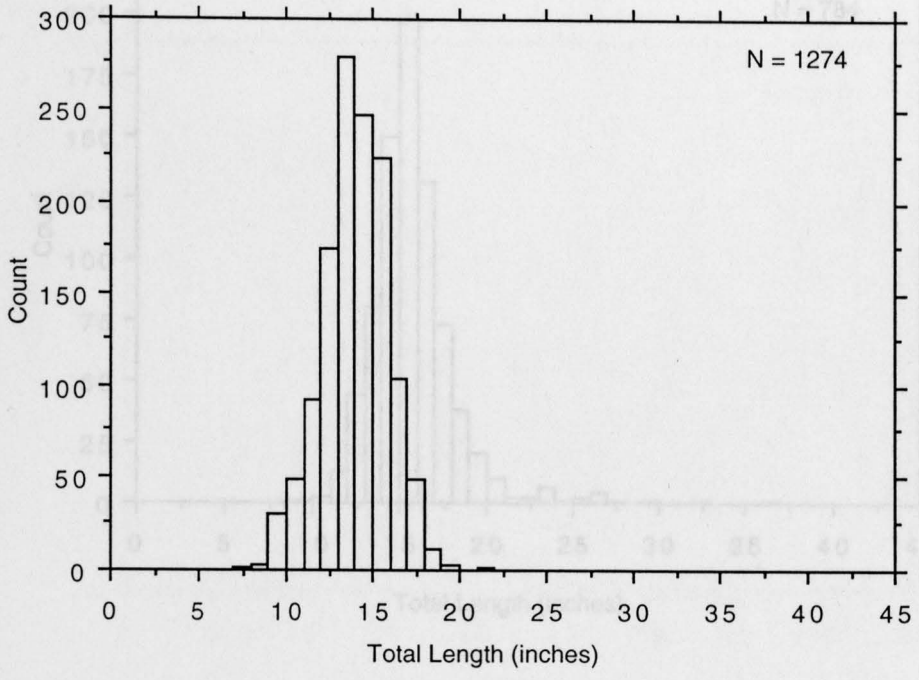


Figure 3. Size distribution of red snapper caught and measured during Texas recreational headboat sets in August and September 1999.

C. Port Aransas (August only).

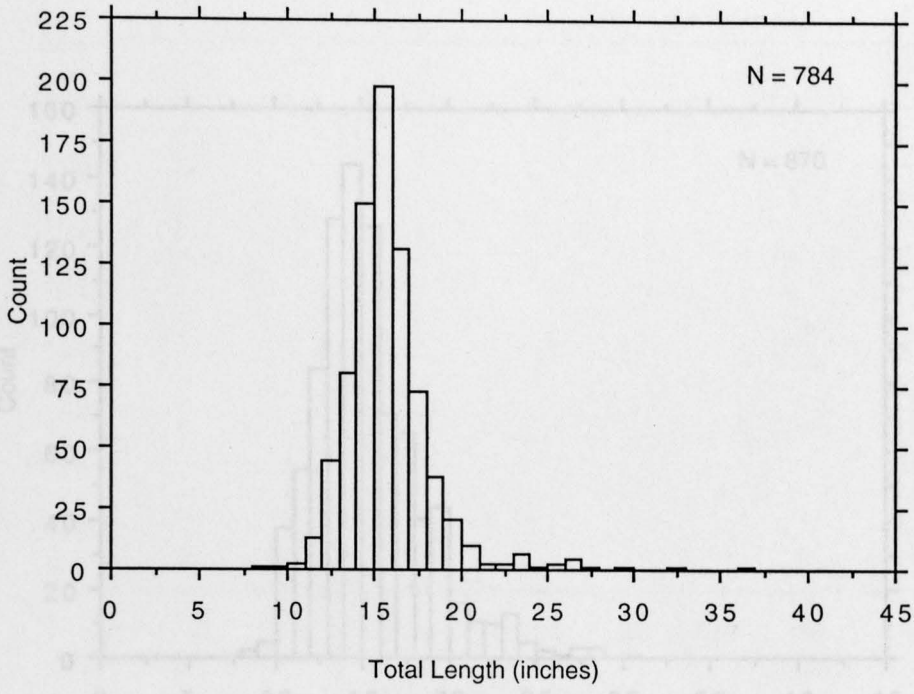


Figure 3. Size distribution of red snapper caught and measured during Texas recreational headboat sets in August and September 1999.

D. Port Isabel (August).

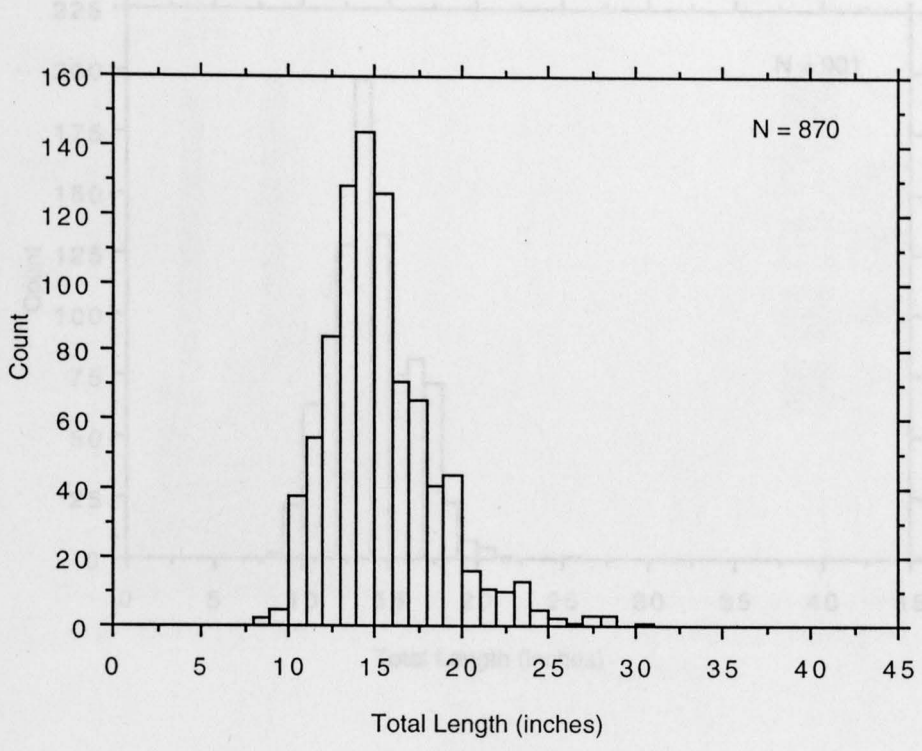


Figure 3. Size distribution of red snapper caught and measured during Texas recreational headboat sets in August and September 1999.

E. Port Isabel (September).

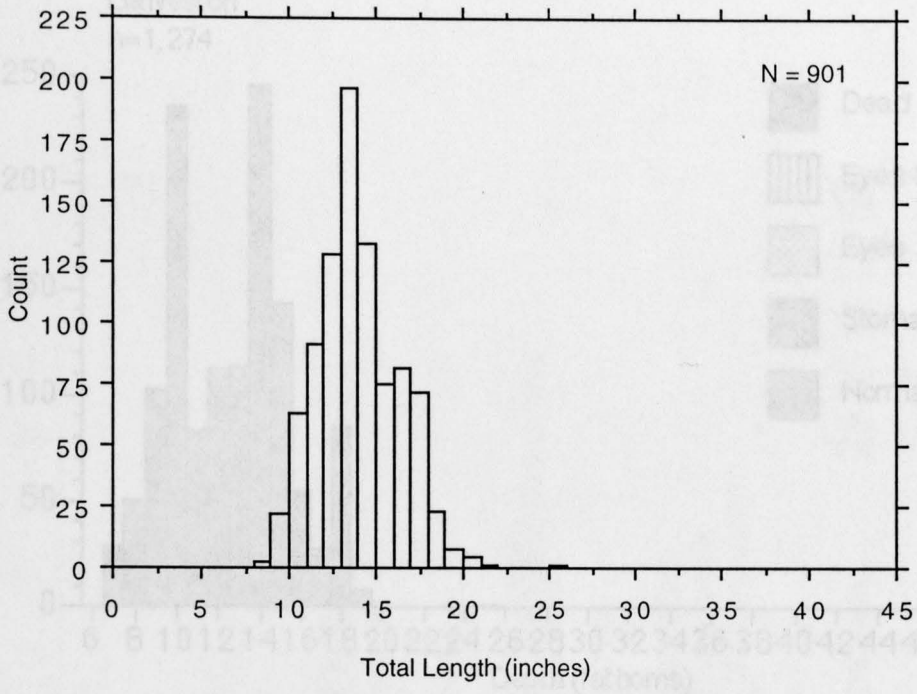


Figure 4. Depth and condition (when brought on board) of red snapper caught and measured during Texas recreational headboat sets in August 1999 by fishing port. A. Galveston; B. Port Aransas; C. Port Isabel.

A. Galveston.

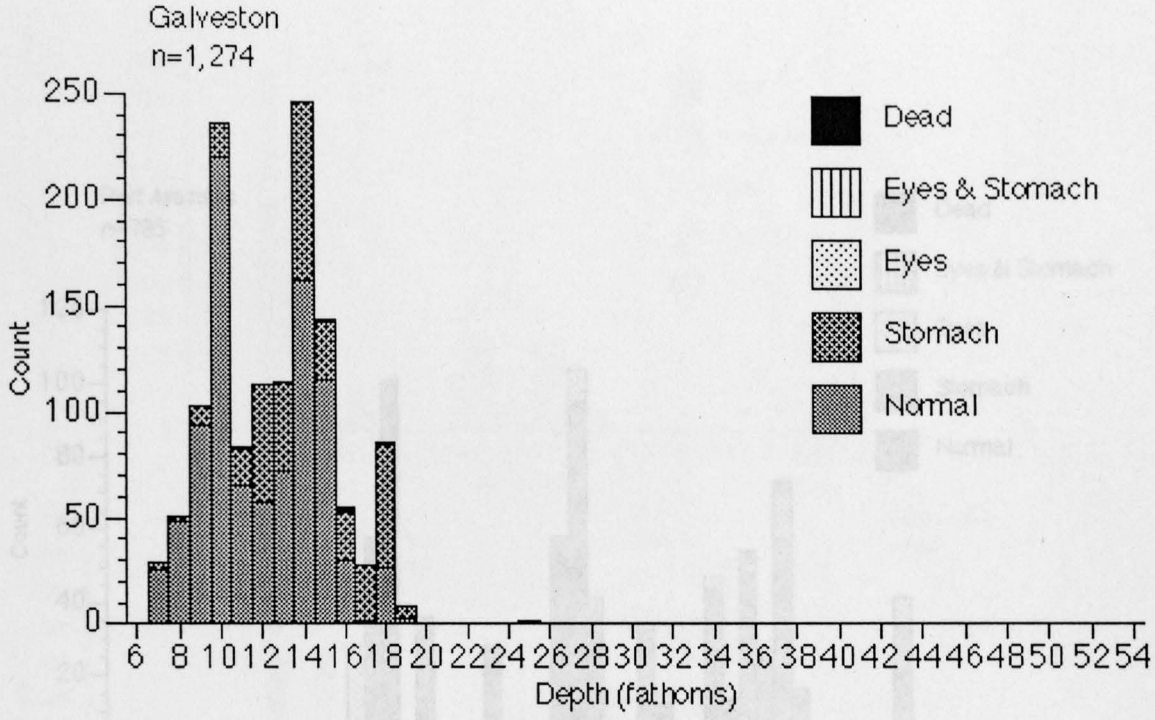


Figure 4. Depth and condition (when brought on board) of red snapper caught and measured during Texas recreational headboat sets in August 1999 by fishing port. A. Galveston; B. Port Aransas; C. Port Isabel.

B. Port Aransas.

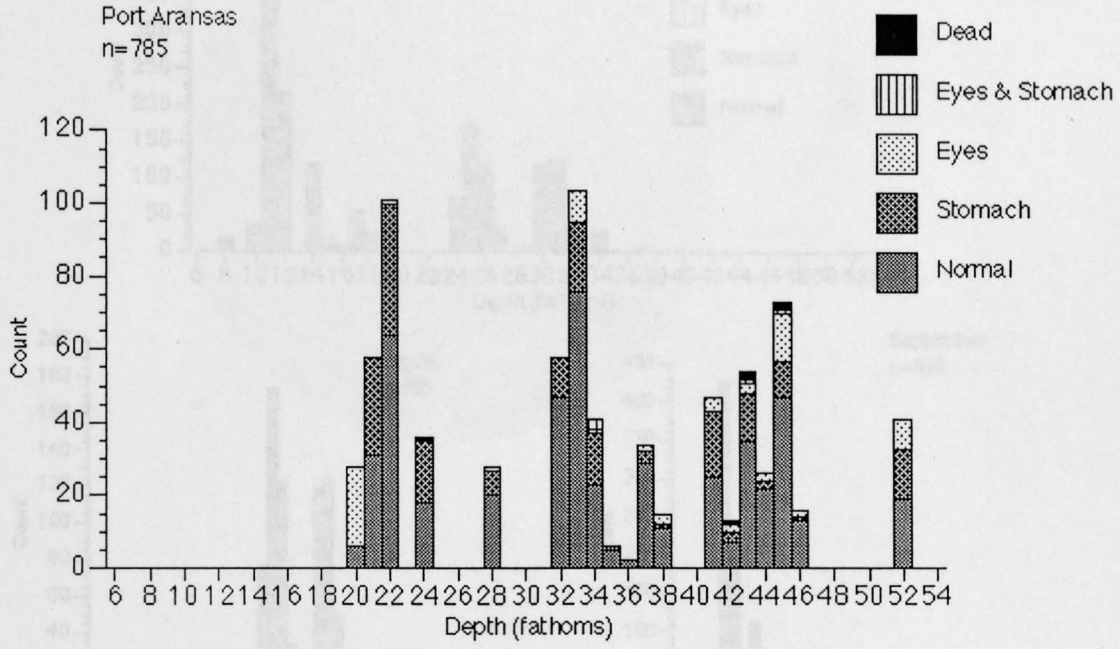


Figure 4. Depth and condition (when brought on board) of red snapper caught and measured during Texas recreational headboat sets in August 1999 by fishing port. A. Galveston; B. Port Aransas; C. Port Isabel.

C. Port Isabel.

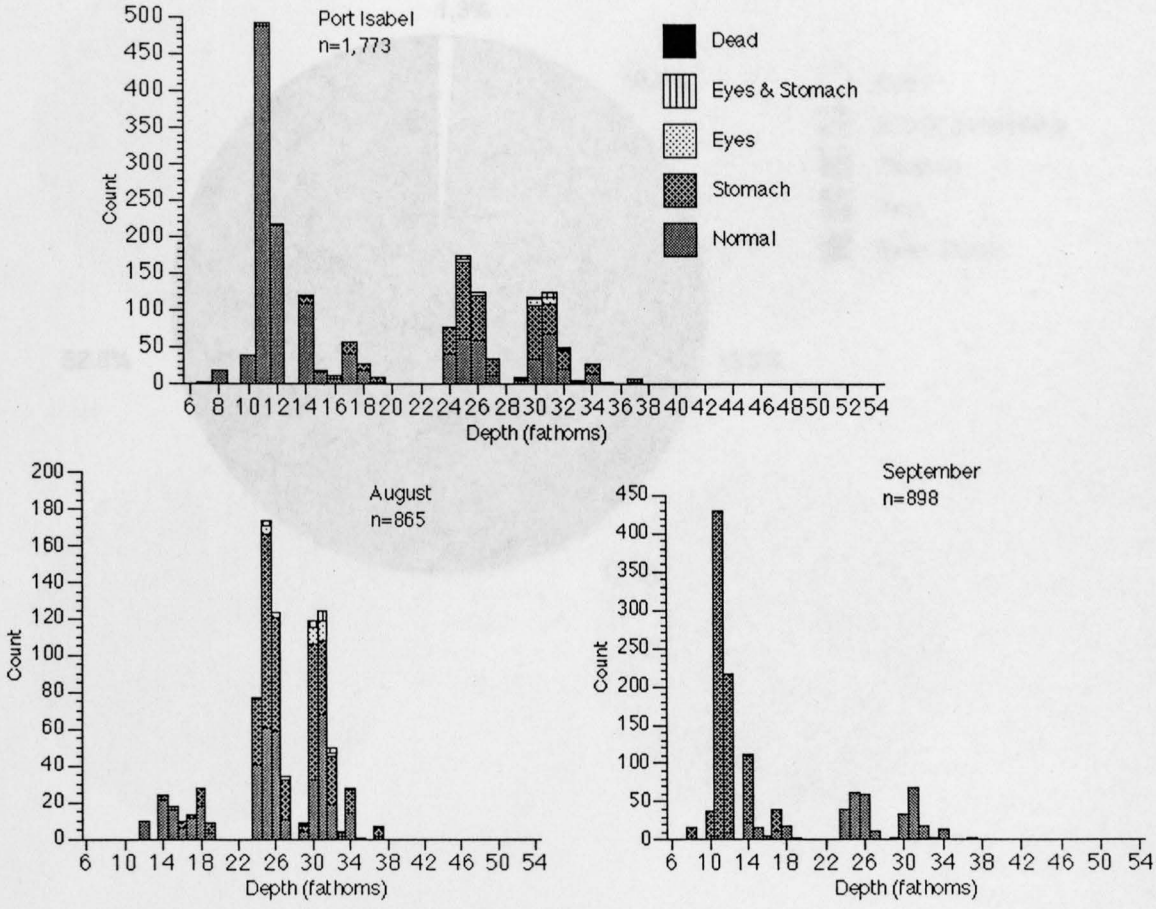


Figure 5. Fate of red snapper caught and measured during Texas recreational headboat sets in August & September 1999 by fishing port. A. Summary; B. By port and month.

A. Summary.

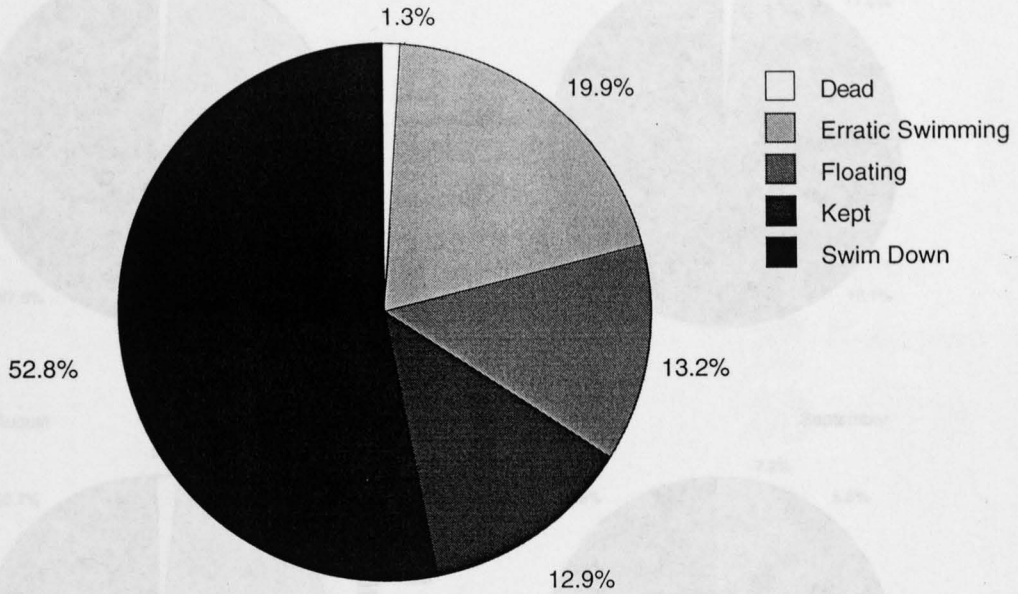


Figure 5. Fate of red snapper caught and measured during Texas recreational headboat sets in August & September 1999 by fishing port. A. Summary; B. By port and month.

B. By port and month.

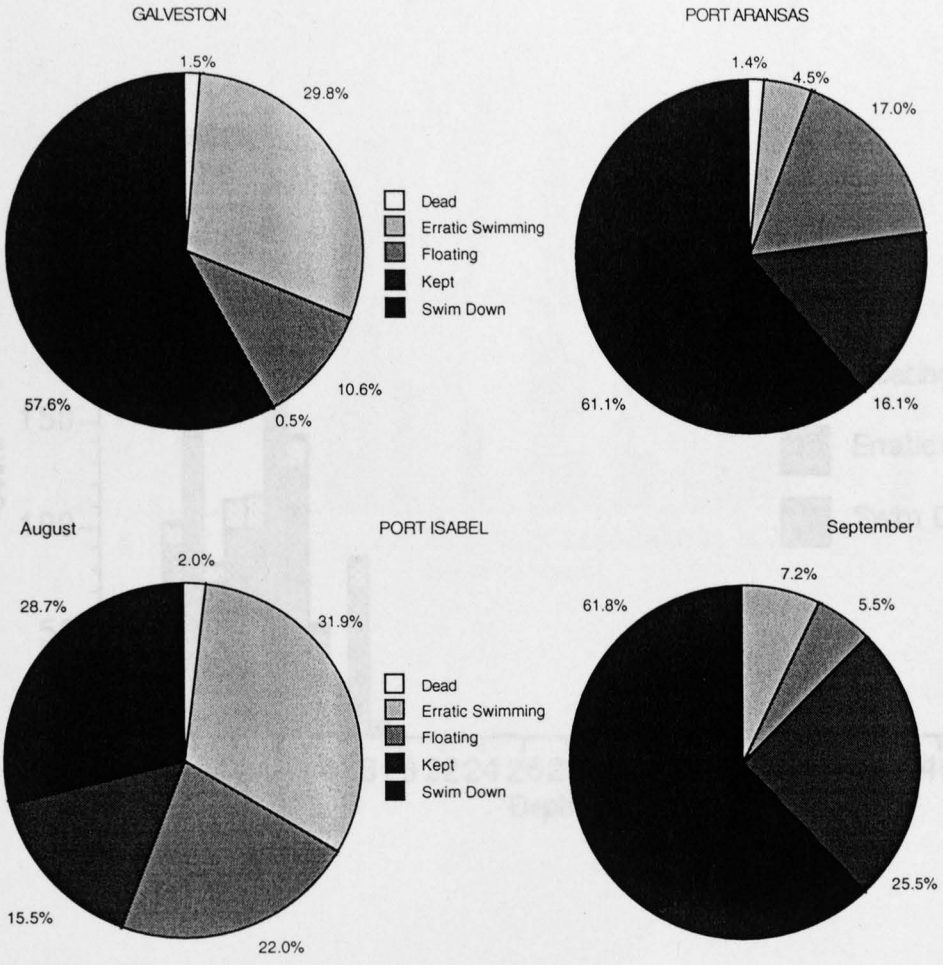


Figure 6. Depth and fate of red snapper caught and measured during Texas recreational headboat sets in August 1999 by fishing port. A. Galveston; B. Port Aransas; C. Port Isabel;

A. Galveston.

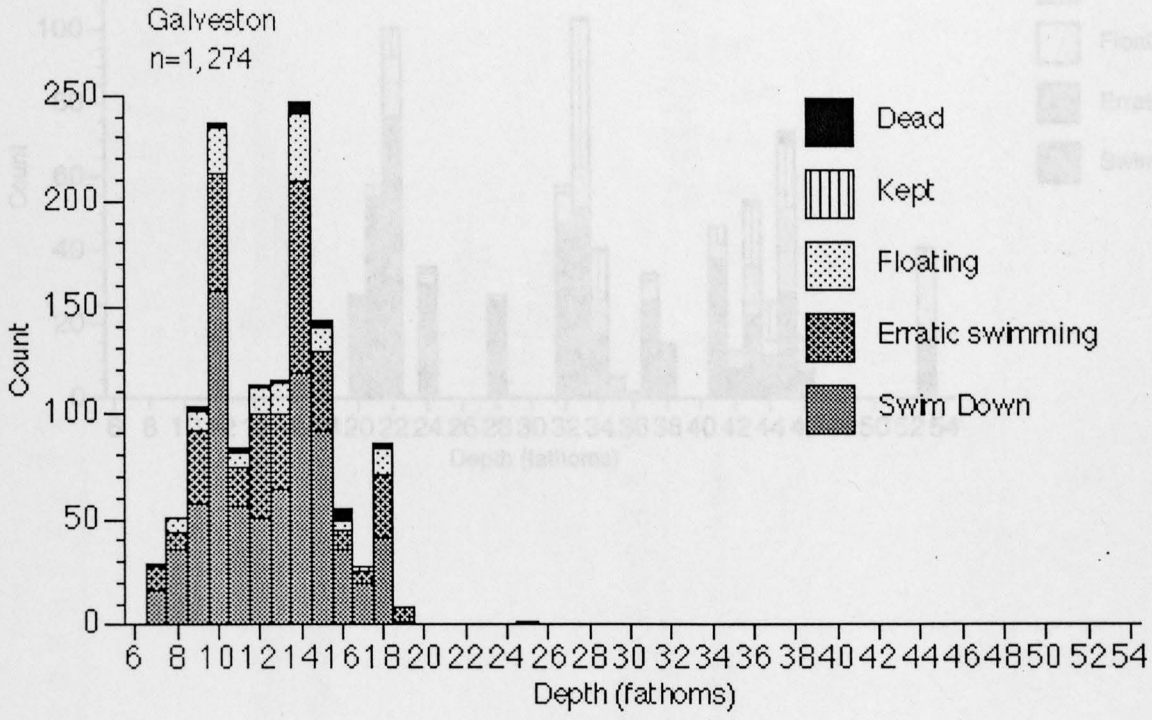
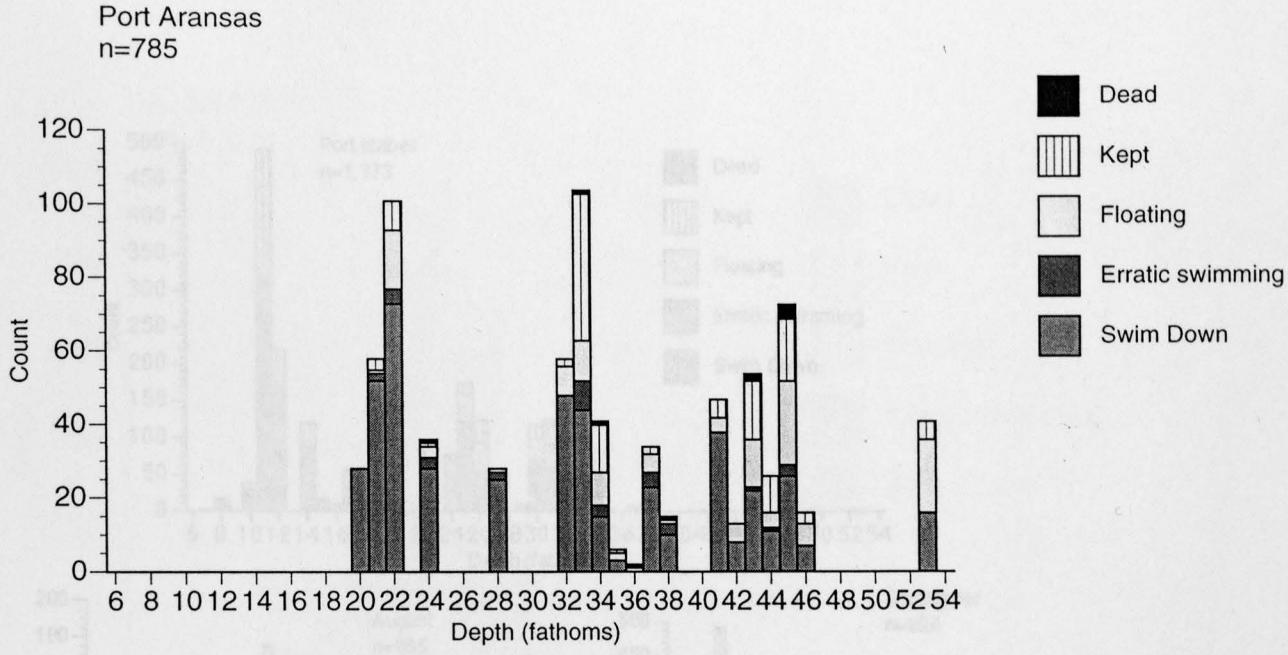


Figure 6. Depth and fate of red snapper caught and measured during Texas recreational headboat sets in August 1999 by fishing port. A. Galveston; B. Port Aransas; C. Port Isabel;

B. Port Aransas.



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C. Port Isabel.

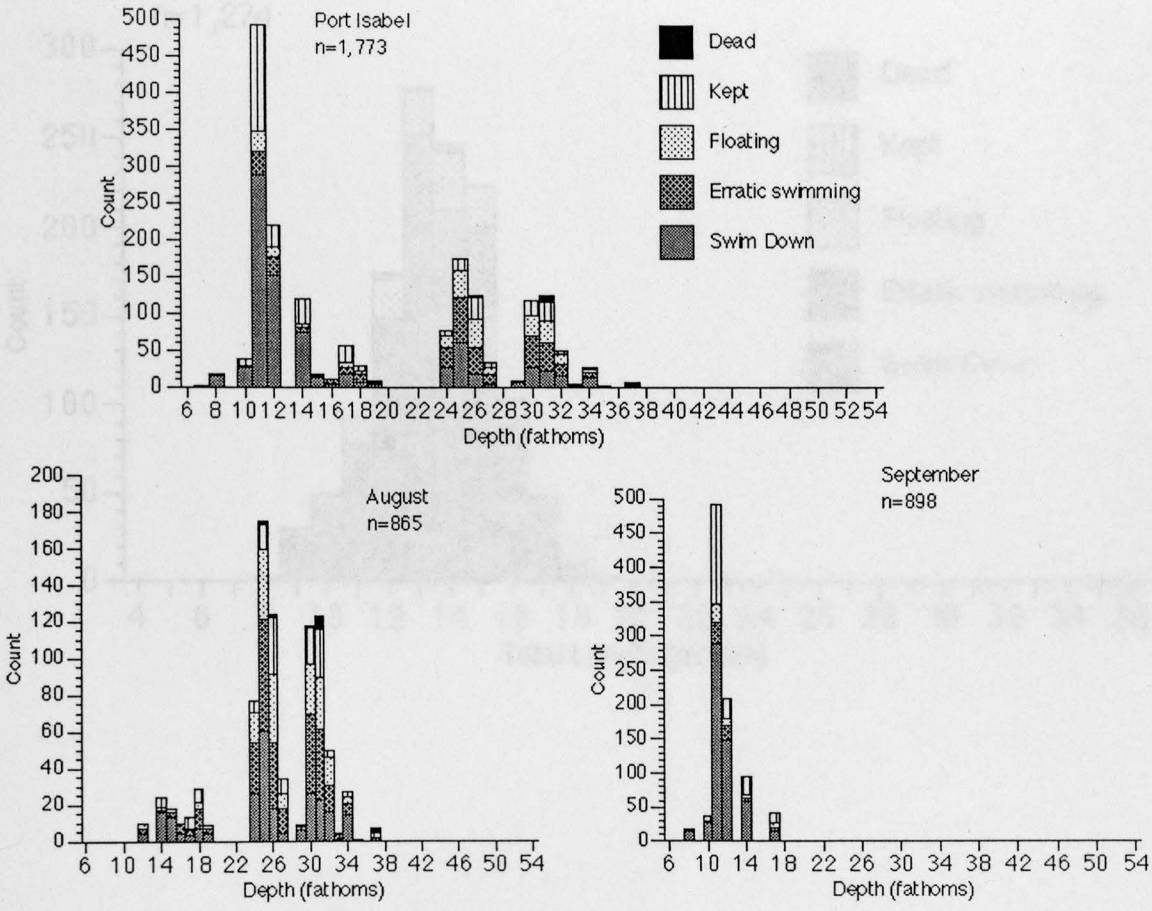


Figure 7. Size and fate of red snapper caught and measured during Texas recreational headboat sets in August and September 1999 by fishing port. A. Galveston; B. Port Aransas; C. Port Isabel.

A. Galveston.

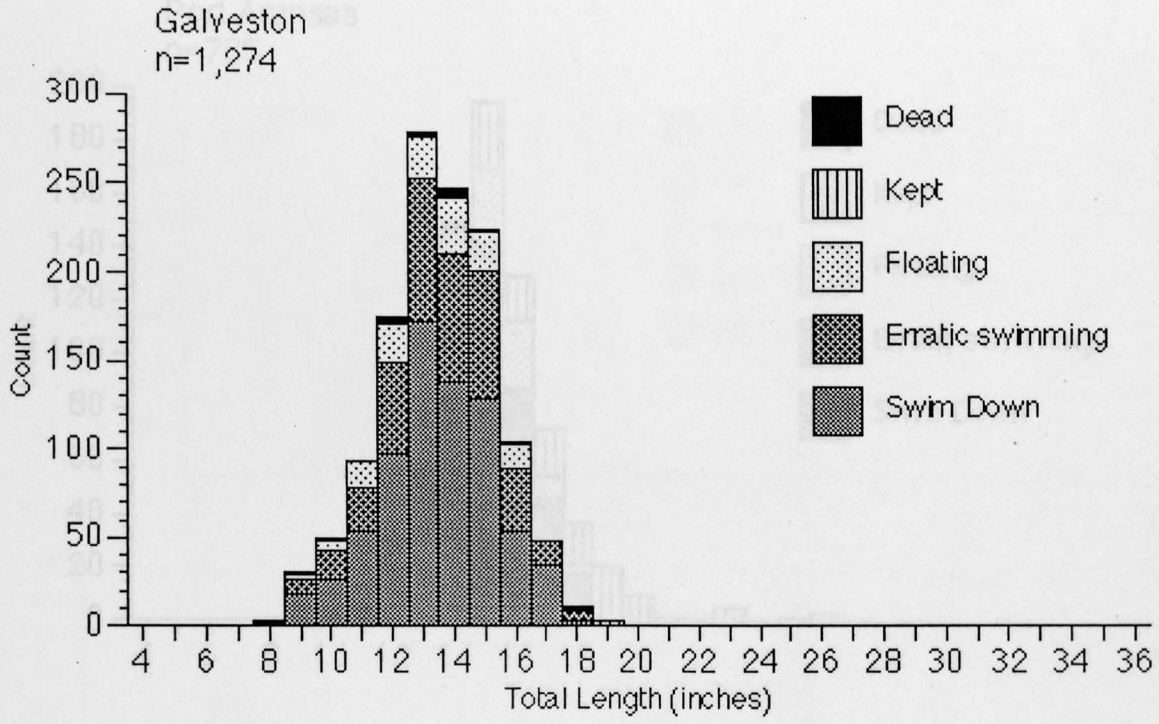


Figure 7. Size and fate of red snapper caught and measured during Texas recreational headboat sets in August and September 1999 by fishing port. A. Galveston; B. Port Aransas; C. Port Isabel.

B. Port Aransas.

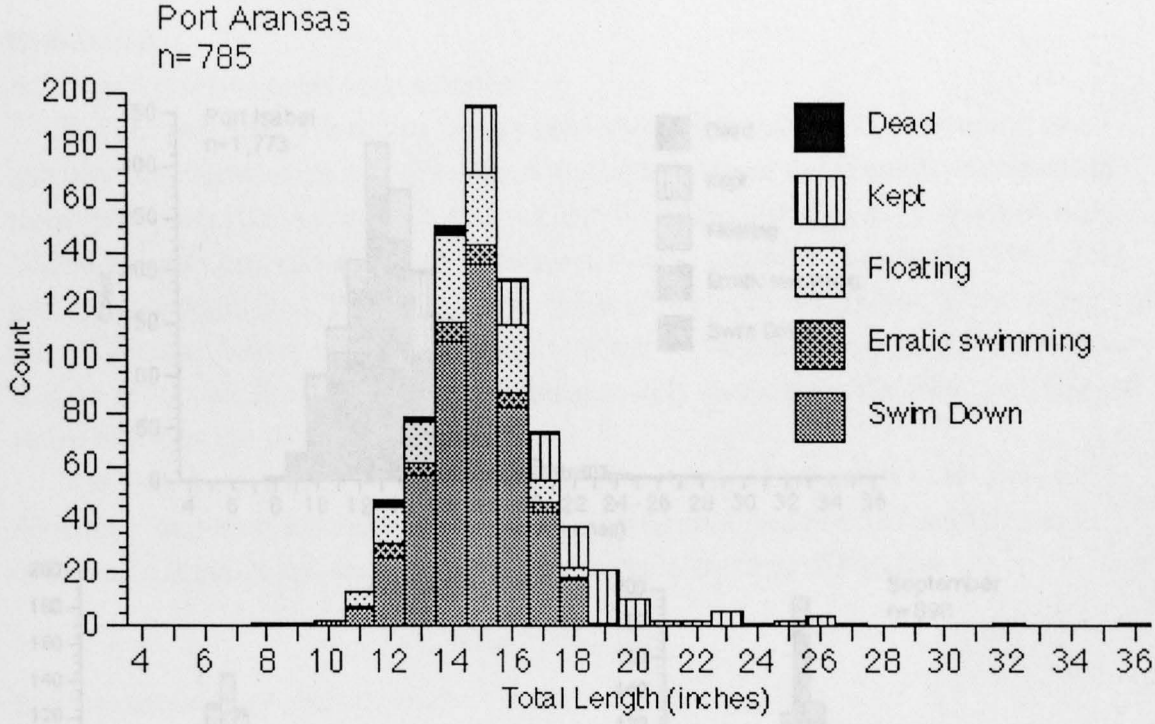
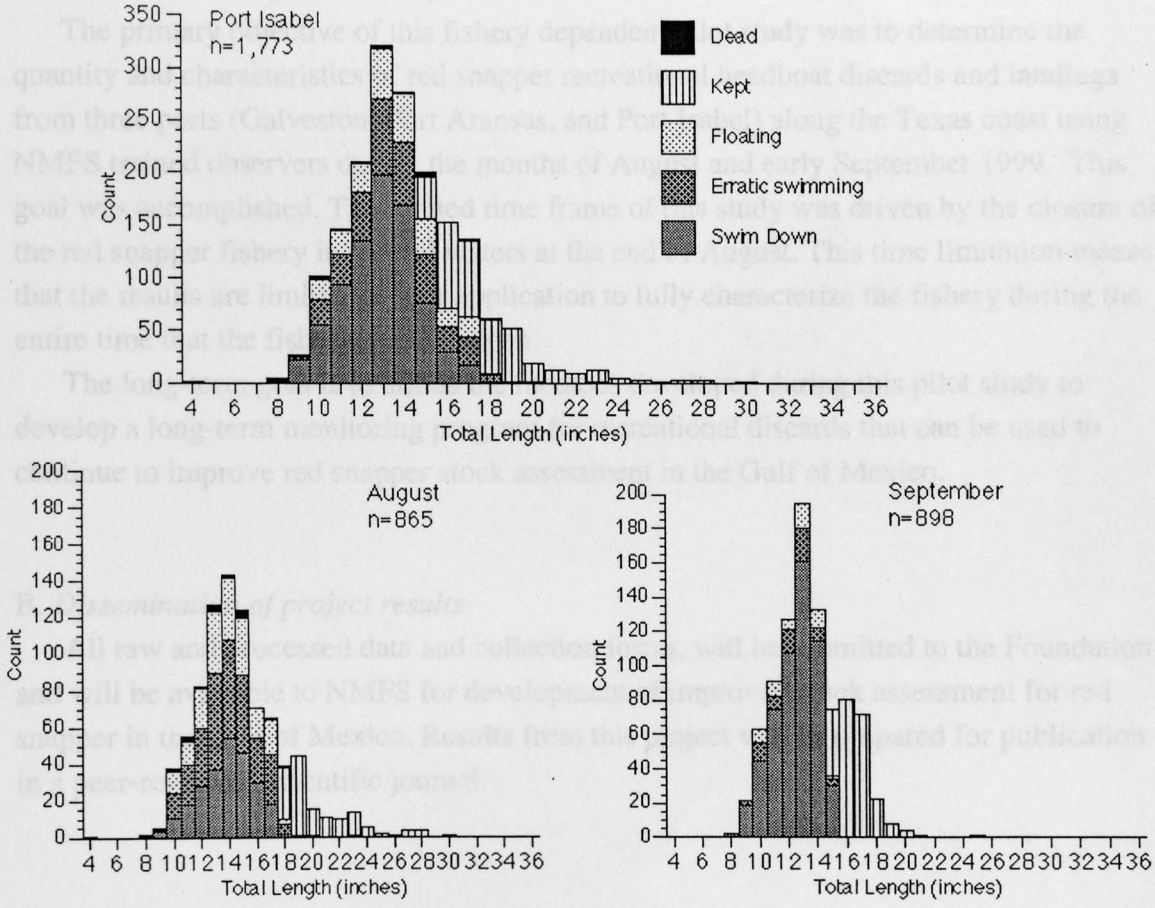


Figure 7. Size and fate of red snapper caught and measured during Texas recreational headboat sets in August and September 1999 by fishing port. A. Galveston; B. Port Aransas; C. Port Isabel.

C. Port Isabel.



B. *Problems*

There were occasions during some trips when the amount of data to be collected became unmanageable due to the large numbers of fish coming on board the boat or other time or weather constraints. During such times, as much information was collected as possible, but at least location, depth, fishing time and an estimate of the total number of snapper released during the busy period. There were also reductions in the number of trips sampled due to weather.

Evaluation

A. *Extent to which goals were attained*

The primary objective of this fishery dependent pilot study was to determine the quantity and characteristics of red snapper recreational headboat discards and landings from three ports (Galveston, Port Aransas, and Port Isabel) along the Texas coast using NMFS trained observers during the months of August and early September 1999. This goal was accomplished. The limited time frame of this study was driven by the closure of the red snapper fishery in federal waters at the end of August. This time limitation means that the results are limited in their application to fully characterize the fishery during the entire time that the fishery remains open.

The long-term goal is to utilize the methods developed during this pilot study to develop a long-term monitoring program for recreational discards that can be used to continue to improve red snapper stock assessment in the Gulf of Mexico.

B. *Dissemination of project results*

All raw and processed data and collection forms, will be submitted to the Foundation and will be available to NMFS for development of improved stock assessment for red snapper in the Gulf of Mexico. Results from this project will be prepared for publication in a peer-reviewed scientific journal.